

Combating COVID-19

Epidemiology, Detection, Public Health Responses

CityU Virtual Conference 2020

Speaker	Program	Time [^]
<ul style="list-style-type: none"> ■ Prof. OLIVIER ANDRE SPARAGANO ■ PAK SOJOENG REBECCA 	Welcoming remark	13:00-13:05
<ul style="list-style-type: none"> ■ LADAN JAHANGIRI* ■ ZIHAN YANG* ■ TONGXU SI* 	Mathematical Models Used to Study the Trend of COVID-19 Outbreak in China, Iran and the United States	13:05-13:35
<ul style="list-style-type: none"> ■ Prof. C.K. MICHAEL TSE 	Modelling COVID-19 Spreading with Human Migration Data and Data-Driven Optimisation	13:35-14:15
<ul style="list-style-type: none"> ■ Dr. SEAN H.Y. YUAN 	How to control a pandemic? From travel restriction, social distancing, to herd immunity.	14:15-14:55
<ul style="list-style-type: none"> ■ PAK SOJOENG REBECCA ■ SUIHONG HUANG * ■ ZHUOGUI LEI 	Up-to-Date Diagnosis, Treatment and Vaccine Development of COVID-19	14:55-15:25
	Break	15:25-15:45
<ul style="list-style-type: none"> ■ Dr. ABHIMANYU THAKUR 	Biosensing of COVID-19: Role of Surface Plasmon Resonance and Atomic Force Microscopy	15:45-16:15
<ul style="list-style-type: none"> ■ RAKESH KUMAR SIDU 	Interferon: the intermediate plan for COVID-19 treatment	16:15-16:45
<ul style="list-style-type: none"> ■ JIATING HUANG 	Traditional Chinese Medicine for Treating Novel Coronavirus Pneumonia (COVID-19)	16:45-17:25
<ul style="list-style-type: none"> ■ THEETHAWAT UEA-ANUWONG* ■ XIUWAN WANG ■ YU SHI 	Outbreak Preparedness and Responses: COVID-19	17:25-17:55
<ul style="list-style-type: none"> ■ PAK SOJOENG REBECCA 	Closing remark	17:55-18:00

*Presenter. [^]The proposed presentation time is subject to change without prior notice.



Speaker: Prof. C.K. MICHAEL TSE

Title: Modelling COVID-19 Spreading with Human Migration Data and Data-Driven Optimisation

Abstract: The 2019 New Coronavirus Disease (COVID-19) outbreak began to occur and escalate in a special holiday period in China (about 20 days surrounding the Lunar New Year), during which a huge volume of intercity travel took place, resulting in outbreaks in multiple regions connected by an active transportation network. Thus, in order to understand the COVID-19 spreading process in China, it is essential to examine the human migration dynamics, especially between the epicentre Wuhan and other Chinese cities. A new Susceptible-Exposed-Infected-Confirmed-Removed (SEICR) model with consideration of intercity travel and active intervention is proposed for predicting the spreading progression of COVID-19. The model takes into account the known or reported number of infected cases being fewer than the actual number of infected individuals due to insufficient testing. The model integrates intercity travel data to track the movement of exposed and infected individuals among cities, and allows different levels of active intervention to be considered so that realistic prediction of the number of infected individuals can be performed.

Biography: Chi K. Michael Tse received the BEng degree with first class honors and the PhD degree from the University of Melbourne, Australia, in 1988 and 1991, respectively. He is presently Chair Professor of Electrical Engineering at City University of Hong Kong. Prior to joining City University in October 2019, he was with the Hong Kong Polytechnic University, where he assumed Head of the Department of Electronic and Information Engineering in 2005-2012 and was a member of the University Council in 2013-2015. His research interests include complex network applications, power electronics and nonlinear systems. He serves and has served as Editor-in-Chief of IEEE Transactions on Circuits and Systems II, IEEE Circuits and Systems Magazine, IEICE Nonlinear Theory and Applications; as Editor of International Journal of Circuit Theory and Applications, and associate editor of a few other IEEE journals. He has been appointed to honorary professorship and distinguished fellowship by a few Australian, Canadian and Chinese universities, including the Chang Jiang Scholar Chair with Huazhong University of Science and Technology, Honorary Professor of Melbourne University, Distinguished International Research Fellow with the University of Calgary, and Distinguished Professor-at-Large with the University of Western Australia.



Speaker: Dr. SEAN H.Y. YUAN

Title: How to control a pandemic? From travel restriction, social distancing, to herd immunity.

Abstract: (To be announced)

Biography: Dr Yuan received his Bachelor of Science degree in Electrical Engineering from National Central University in Taiwan in 1999. He received his Master of Science in Biomedical Engineering from National Taiwan University in 2001 working on Artificial Intelligence with a focus on Medical Natural Language Processing. He received his second Master degree in Microbiology (Immunology Division) from National Taiwan University under the guidance with Prof. Yuan-Tsong Chen at Academia Sinica. His thesis work focused on the Pharmacogenetic study of Warfarin responsiveness. In 2007, Dr Yuan pursue his PhD degree in Computational Biology & Bioinformatics in the Lab of Katia Koelle at Duke University focusing on mathematical modelling of influenza antigenic drift. After the completion of the graduate school in 2013, Dr Yuan moved to London to study the impact of herd immunity on influenza outbreak with Prof. Steven Riley at Imperial College London. Dr Yuan joined CityU as an Assistant Professor in January 2018.



Speaker: Dr. JIATING HUANG

Title: Traditional Chinese Medicine for Treating Novel Coronavirus Pneumonia (COVID-19)

Abstract: A novel coronavirus (COVID-19) emerged in December 2019 in Wuhan, China, and then spread rapidly worldwide. By June 1, 2020, it has led to 3184999 confirmed patients and high mortality up to ~11.7% in the world. Scientists have not found the specific effective treatment for COVID-19. According to past experiences in the treatment of infectious diseases in China, Tradition Chinese Medicine, including herbal formulas, can be used to prevent and treat such epidemic disease. Therefore, Traditional Chinese Medicine (TCM) is widely used in the treatment of COVID-19 in China promptly. Here we introduce the commonly recommended formulas in Chinese hospitals. These formulas have been reported some benefits including shortening the average length of stay in the hospital and increasing the improvement rate of CT image and the clinical cure rate.



Speaker: Dr. ABHIMANYU THAKUR

Title: Biosensing of COVID-19: Role of Surface Plasmon Resonance and Atomic Force Microscopy

Abstract: Novel coronavirus disease (COVID-19) has become a global pandemic, claiming around 380 thousand, and infected around 6.29 million individuals worldwide (until 04-Jun-2020). To control the spread of the dreaded COVID-19, the prevailing public health crisis demands a reliable diagnostic method. Currently, reverse transcription polymerase chain reaction (RT-PCR) and antibody-based methods for the detection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2); the virus causing COVID-19, are found to be standard methods. However, the existing methods have shown a numerous case of either false positive or false negative, which warrants the development of alternative tools for the precise diagnosis of COVID-19.

For a long time, localized surface plasmon resonance (LSPR) and atomic force microscopy (AFM); advanced label free biosensing tool have been utilized as the diagnostic tools for studying disease biomarker of various diseases including virus. In my talk, I will explain the potential of LSPR- and AFM- based biosensors for the diagnosis of COVID-19 via detection of different components of SARS-CoV-2.

Biography: Dr. Abhimanyu Thakur obtained his B.Pharm. (2009-13) from B.C.D.A. College of Pharmacy & Technology (affiliated to WBUT, Kolkata, India), and M.Pharm. in Clinical Research (2013-15) from Birla Institute of Technology (BIT) Mesra, Ranchi, India. After working as a Drug Safety Associate (Pharmacovigilance Department) at Quintiles Research (India), he moved to Hong Kong to pursue Ph.D. in Biomedical Sciences (2015-2019) at the Department of Biomedical Sciences, City University of Hong Kong (CityU), where he investigated the role of glioma-derived exosomal surface proteins as biomarkers and functional mediators (Advisor: Dr. Youngjin Lee). As one of the key findings, he clearly distinguished tumor derived-exosomes and microvesicles based on their biophysical properties. Additionally, he detected glioma specific mutant EGFRvIII protein on exosomes by biosensor, which can be applicable for liquid biopsy for tracking malignant progression of glioma. Next, he will work as Post-Doctoral Fellow in the Ben May Department of Cancer Research at the University of Chicago, Illinois, USA. His Post-Doc research will be focused on the crosstalk of stem cells-derived exosomes in tumor micro-environment (Advisor: Dr. Huanhuan Joyce Chen).

He is the recipient of prestigious Young Investigator Award (2019) conferred by American Association for Cancer Research (AACR)-Korean Cancer Association

(KCA), Service Appreciation Award by Hong Kong Precision Oncology Society (2018), CityU Outstanding Academic Performance Award (2018), CityU-Chow Yei Ching School of Graduate Studies (SGS) Research Tuition Scholarship (2018), Hong Kong-University Grant Commission (UGC) PhD scholarship (2015-18), travel grants for the Global Young Scientist Summit-2018 organized by Nanyang Technological University, Singapore, 109th Annual meeting of AACR-2018, Chicago, Illinois, USA, and “All India Council for Technical Education (AICTE)”- Graduate Pharmacy Aptitude Test (GPAT, formerly known as GATE) scholarship (2013-15).



Speaker: RAKESH KUMAR SIDU

Title: Interferon: the intermediate plan for COVID-19 treatment

Abstract: SARS-COV-2 caused COVID-19 is claiming more than 380,000 deaths with no approved antiviral vaccine or drug for the treatment. In this current scenario, using approved interferon drugs for treatment puts a promising hope to the infected patients worldwide. Interferon are a group of naturally occurring proteins present in the immune system which acts as the ‘First responders’ to any type of viral infection. Moreover, they activate several other neighbouring cells through genes called Interferon-stimulated-gene (ISG) to produce more of the interferons and destroy the capability of further invasion of virus. In the process making the immune system stronger, faster clearance of virus and speedy recovery. Recent studies discover that SARS-COV-2 suppresses Type I and III interferons while elevating chemokines and interleukin levels, which followed by the ‘cytokine storm’, enhanced complications from the infection and fatality. In contrast, other virus such SARS-COV, MERS-COV has higher activation of interferons and lower adaptive immune response. Consequently, suggesting the role of interferons in the initial stages of infection and warrants development of Interferon based drugs.

Biography: Rakesh Kumar SIDU earned his Bachelor degree in Biomedical Engineering (2012-16) from National Institute of Technology (NIT), Rourkela. He worked in the development of invasive detection in anti- cancer drug screening using Electric-cell Substrate Impedance Spectroscopy (ECIS). Thereafter, he obtained his Masters in Biomedical Engineering (2016-18) under Dr. Sanjeev Kumar Mahto in the Tissue Engineering and Bio-microfluidics Laboratory from Indian Institute of Technology (IIT-BHU), Varanasi. He worked on the manipulating the surface chemistry of Si-substrate to fabricate biosensor and understanding the assembly of skeletal muscle stem cells or ‘satellite cells’. Moreover, he worked in the fabrication of cortisol sensor for the monitoring of hypertension using human saliva samples. In addition, he mentored an undergraduate project in the development of portable mini-microscope optimised for in-vitro applications such as live cell imaging, brightfield imaging and got selected as one of ten best projects across in the Institute Day at IIT BHU, 2018 honoured by Nobel laureate, Ada.E. Yonath.



Speaker: THEETHAWAT UEA-ANUWONG

YU SHI

XIUWAN WANG

Title: Outbreak Preparedness and Response; COVID-19

Abstract: Over the past six months of the outbreak of Coronavirus Disease-2019 (COVID-19), more than 6 million people across all six regions under responsibility of the World Health Organization (WHO) were infected. Under International Health Regulation (IHR) (2005), WHO together with the emergency committee have substantially provided advices and supports in order to fight against the pandemics. This study aims to illustrate roles and responsibilities of involving sectors and organizations in the preparedness and response to COVID-19 pandemic at the global, regional and national level as well as to demonstrate five main components essential to outbreak preparedness. It is found that WHO established international collaboration and operational support, scaled up country readiness and response operations, and accelerated priority research and innovation regarding COVID-19. Several organizations and ad hoc teams such as the United Nations Inter-Agency Standing Committee (UNIASC), Regional Incident Management Support Team (Regional IMST), and Public Health Emergency Operation Centre (PHEOC) have been involved in the global, regional and national coordination networks, respectively to strengthen the capacities of the system in various aspects. Five main components for pandemics preparedness and responses include infectious disease surveillance, effective risk communication, medical services and supplies management, incident management, and community resilience. They are critical to slow down the spread, stop disease transmission, prevent further outbreaks and minimize the impact of a disease outbreak on physical and mental health, social services, and economic activities.



Speaker: LADAN JAHANGIRI

ZIHAN YANG

TONGXU SI

Title: A review on mathematical models used to study the trend of COVID-19 outbreak in China, Iran and the United States

Abstract: A novel coronavirus (COVID-19, also called 2019-nCov), firstly reported in late December of 2019, has caused an ongoing outbreak of pneumonia in many countries throughout the world. Similar to other coronaviruses resulting in pneumonia, this deadly virus can lead to an acute respiratory distress syndrome (ARDS). According to the Coronavirus Resource Centre of John Hopkins University, as of June 3, 2020, the United States, Brazil, Russia, the United Kingdom, Spain, Italy, India, France, Germany, and Peru are the top ten countries regarding the total number of confirmed cases, respectively. This trend has been changing since the beginning of the pandemic. We are still observing the growth of the disease in some countries while others have already flattened the curve. There have been several studies focusing on modelling COVID-19 spread and trend. Such tools are highly believed to help taking pre-emptive measures into account with prediction of outbreak in a country or region. In this presentation, we aim at studying the trend of COVID-19 outbreak in China, Iran, and the United States as representatives of countries in Far East, Middle East, and America. First, we focus on the trend of infection since the time when the first cases were reported in each country. Then, we summarize the predictions have been made on the trend of the disease using different mathematical models.



Speaker: PAK SOJOENG REBECCA

SUIHONG HUANG

ZHUOGUI LEI

Title: Coronavirus Disease 2019 (COVID-19): Up-to-date Diagnoses, Treatments and Vaccines

Abstract: COVID-19, the novel infectious disease caused by the SARS coronavirus type 2 (SARS COV-2), originated in Wuhan, China in 2019 and has spread globally. To timely tackle the spread of the infection, making an accurate diagnosis and developing effective treatments and vaccines for COVID-19 are imperative. Here we review the up-to-date diagnoses, progress of treatments and vaccine development for COVID-19. Firstly, for diagnosis, the definitive test of SARS-CoV-2 is the real-time reverse transcriptase-polymerase chain reaction (RT-PCR) test to detect viral nucleic acids from throat swab or lower respiratory samples, supported by clinical symptoms, lung imaging features, exposure history and blood testings. Secondly, we will talk about several treatments now being under extensive research on COVID-19, specifically in terms of administration of convalescent plasma therapy and antimalarial medication (chloroquine and hydroxychloroquine (HCQ)) with meaningful clinical trial results. Lastly, we will talk about the most recent progress of COVID-19 vaccine under the accelerated timeline with overlapping phases and emergency use authorization.

Organisers

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